Amendments to the Specification:

Please replace paragraph **[0002]** with the following amended paragraph:

[0002] Crude oil is the largest and most widely used natural resource in the world, serving as a source of a wide range of fuels for consumer and industrial use as well as chemicals for use as raw materials in products used every day worldwide. Petroleum residua (or "resids ~~resides~~") are the heavy fraction remaining after petroleum crudes are distilled at atmospheric pressure or at reduced pressure, i.e., the residue left after the most readily accessible components of the petroleum are extracted. Resids are highly complex in composition, including components of high molecular weight as well as polynuclear aromatics, coke, asphaltenes, resins, small ring aromatics, and saturates. Unfortunately, resids ~~resides~~ are of extremely limited utility. A variety of conversion processes have been developed to increase the utility of, or obtain useful products from, resids. These processes include separations, thermal conversion, hydroconversion or hydrotreating, and fluid catalytic cracking. The processes that are the most economical, however, result in a carbonaceous byproduct that is even heavier than the starting resid, including further formation of polynuclear aromatics. Processes that involve the use of catalysts are also costly due to the cost of the catalysts themselves and the expense of recovering and recycling the catalysts after use. Also, the petroleum industry is continually seeking ways to utilize resids of lower quality and lower cost due to a continual need for new sources of crude oil and to continuing pressure from the public and regulatory agencies to make use of these resids rather than to dispose of them. As a result, processes that can economically and effectively convert these resids to lighter components are continually needed.

Please replace paragraph **[0009]** with the following amended paragraph:

[0009] In certain embodiments of this invention, a surface active agent or other emulsion stabilizer is included to stabilize the emulsion as the organic and aqueous phases are being

prepared for the ultrasound exposure. Certain petroleum fractions contain surface active agents as naturally-occurring components of the fractions, and these agents may serve by themselves to stabilize the emulsion. In other cases, synthetic or non-naturally-occurring surface active agents can be added. Any of the wide variety of known materials that are effective as emulsion stabilizers ~~stablizers~~ can be used. These materials are listed in various references such as McCutcheon's Volume 1: Emulsifiers & Detergents – 1999 North American Edition, McCutcheon's Division, MC Publishing Co., Glen Rock, New Jersey, USA, and other published literature. Cationic, anionic and nonionic surfactants can be used. Preferred cationic species are quaternary ammonium salts, quaternary phosphonium salts and crown ethers. Examples of quaternary ammonium salts are tetrabutyl ammonium bromide, tetrabutyl ammonium hydrogen sulfate, tributylmethyl ammonium chloride, benzyltrimethyl ammonium chloride, benzyltriethyl ammonium chloride, methyltricaprylyl ammonium chloride, dodecyltrimethyl ammonium bromide, tetraoctyl ammonium bromide, cetyltrimethyl ammonium chloride, and trimethyloctadecyl ammonium hydroxide. Quaternary ammonium halides are useful in many systems, and the most preferred are dodecyltrimethyl ammonium bromide and tetraoctyl ammonium bromide.

Please replace paragraph **[0010]** with the following amended paragraph:

[0010] Surface active agents that will promote the formation of an emulsion between the organic and aqueous phases upon passing the liquids through a common mixing pump, but that will spontaneously separate the product mixture into aqueous and organic phases when allowed to settle can also be used. Once settled, the phases can be separated by decantation or other conventional phase separation procedures. One class of surface active agents that will easily form an ~~and~~ emulsion and yet separate ~~separated~~ readily is liquid aliphatic C_{15}-C_{20} hydrocarbons and mixtures of such hydrocarbons, preferably those having a specific gravity of at least about 0.82, and most preferably at least about 0.85. Examples of hydrocarbon mixtures that meet this description and are particularly convenient for use and readily available are mineral oils,

preferably heavy or extra heavy mineral oil. The terms "mineral oil," "heavy mineral oil," and "extra heavy mineral oil" are well known in the art and are used herein in the same manner as they are commonly used in the art. Such oils are readily available from commercial chemicals suppliers throughout the world. The amount of mineral oil can vary and the optimal amount may depend on the grade of mineral oil, the composition of the resid or crude oil fraction, the relative amounts of the aqueous and organic phases, and the operating conditions. Appropriate selection will be a matter of routine choice and adjustment to the skilled engineer. In the case of mineral oil, best and most efficient results will generally be obtained using a volume ratio of mineral oil to the organic phase ~~phase l~~ of from about 0.00003 to about 0.003.

Please replace paragraph **[0019]** with the following amended paragraph:

[0019] Operating conditions in general for the practice of this invention can vary widely, depending on the material being treated and the manner of treatment. The pH of the emulsion, for example, may range from as low as 1 to as high as 10, although best results are presently believed to be achieved within a pH range of 2 to 7. The pressure of the emulsion as it is exposed to ultrasound can likewise vary, ranging from subatmospheric (as low as 5 psia or 0.34 atmosphere) to as high as 3,000 psia (214 atmospheres), although preferably less than about 400 psia (27 atmospheres ~~atmopheres~~), and more preferably less than about 50 psia (3.4 atmospheres), and most preferably from about atmospheric pressure to about 50 psia.